AN IMPROVED SLIDE FOR THE EXAMINATION OF GASEOUS MATTER.

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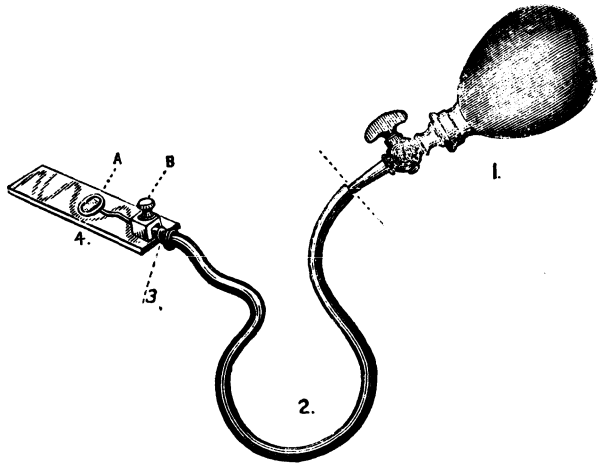
The apparatus described in this paper, is designed for the examination of aerial or gaseous material, with the higher power objectives, without subjecting such material to any previous manipulations; thus enabling one to collect and immediately examine with any objective, even a 25th or perhaps a 50th inch. The apparatus consists of,



First, a rubber bag (Fig. 1), provided with a tapering, hard-rubber nozzle, into which is inserted a perfectly tight-fitting stop-cock (a).

Second, a piece of soft rubber tubing (Fig. 2), ⅛ inch in diameter and about two feet long. One end of this is furnished with a metal collar, to be inserted into the outer end of the brass canule belonging to the slide; while the other or naked end is to be slipped over the tapering nozzle of the receiving-bag.

Third, a small canule (Fig. 3), about 1½ inches long, the larger extremity of which, by its square shoulder, fits into the post fixed upon the glass slide, while its small end is inserted into the minute hole at the side of the cell. The larger extremity is smoothly ground, to receive the metal-finished end of the conducting tube.

Fourth, a glass slide (Fig. 4), upon which is built an ordinary cell (a), in this case of rubber. At one end of the slide is a brass post, which is fastend by two small screws coming through the slide from below.

Observe, also, that the post has a perforation with square sides, for the reception of the little brass canule (Fig. 3), and also that on the top the post is provided with a small set-screw (b) for the purpose of holding the canule firm. At the side of the cell toward the post, is a minute opening communicating with the inside of the cell to receive the small end of the canule.

The cell is similar to any other cell, except that its middle portion is built up from the bottom by a piece of glass; the object of this device being to bring the bottom of the cell within the working distance of the objective, allowing depth enough at the sides, which may be compared to two ditches, for the introduction of a canule of reasonable caliber. This is an important point, inasmuch as a cell shallow enough for the adjustment of its bottom to the focus of a first class ⅛ inch objective, could have a depth of only about a fortieth of an inch, and of course for higher powers, less; altogether too shallow to allow of the introduction of a canule of practicable size.

But, upon this plan, the cell may be built up ever-so-much, even for adjustment of a 1-50 inch objective; while yet at its sides will remain the same depth of ditches, or *sulci*, as we may properly call them, for the ingress of the gas.

The cover-glass over the cell may be cemented on, thus hermetically closing the cell, or it may be laid on loosely. In the former case the opposite *side* of the cell must be perforated to allow the gas or air to escape, while in the latter case it escapes by itself lifting up from time to time the cover-glass.

As all objects or particles contained in the air or gas must be at rest when examined with the higher power objectives, it will be necessary to coat either the bottom of the cell, the cover-glass, or

both, with something to which the material will adhere, as the gas passes through. One of the best methods is to coat both the bottom of the cell and under side of the cover-glass with a thin layer of glycerin—somewhat after Beale's method of collecting aerial germs. This coating is easily accomplished by previously moistening the glass with alcohol. The rubber bag and conducting-tube may be cleansed by drawing alcohol into them, and after expelling this, they may be easily dried, if desired, by drawing and expelling air for awhile.

This apparatus was made for me by Messrs. Queen & Co., of Philadelphia; and to Mr. Pennock, there, I am greatly indebted for several suggestions, as well as the excellent workmanship displayed.

All the parts being in proper connection, by opening the stop-cock of the receiver, and gently pressing upon it the cell may be supplied at will. As before stated, any gaseous material can be collected and kept any length of time from the access of air, and, when desired, *directly* examined under the microscope without any intermediate manipulation; a great desideratum, and one which cannot be attained, so far as I have been able to learn, by any other slide or apparatus hitherto in use. Those most used are the "Stricker" and "Hunt" gas slides, the Holman "life slide" and the animalcule cell or cage, none of which is applicable in examinations with the higher power objectives; and none of which, excepting one, is arranged so as to allow of the direct introduction, in small quantity, of gaseous material. The advisability, nay, the necessity of more perfect means for the examination of aerial or gaseous matter, must have been felt by everyone who has ever attempted any work in this direction; and it is obviously only by patient investigation with high-power objectives, that we can hope to discover the nature and habitat of those infinitesimal organic poisons which are supposed to originate, in some unknown way, the so-called zymotic diseases.

Thus far these poisons have eluded human search, and are only known by their effects upon organic bodies. Indeed scientists are yet in controversy as to whether or not there are such things as "disease germs," and if so whether they are by nature micophytes or microzoöns; or whether they develop in the body, or are introduced from without.

That these subtle poisons are ferments causing destruction by catalytic action, seems highly probable, because the phenomena consequent upon their action or life, does not accord with our knowledge of mere chemical mutations, but are rather analogous to the grosser fermentations, of every day observation. Therefore it seems to me that a rich harvest of discovery remains to be garnered from this, as yet, imperfectly explored field of science; and if we can but have the means of handling, as it were, this vast but impalpable material which everywhere surrounds us, it seems that an important step could be achieved.